BIOGRAPHICAL SKETCH

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NAME: Ren, Gang (Gary)

eRA COMMONS USER NAME (credential, e.g., agency login): gangren

POSITION TITLE: Career Staff Scientist (P.I.)

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Lanzhou University, China	B.S	06/1990	Theoretical Physics
Lanzhou University, China	M.S.	06/1993	Theoretical Physics
Univ. of Science and Technology Beijing, China	Ph.D.	06/1997	Material Physics (Electron Microscopy)
The Scripps Research Institute, La Jolla, CA, USA	Postdoctoral	06/1997-01/2004	Cell Biology (Cryo-Electron Microscopy)

A. Positions and Honors

Positions

1999-2001 American Heart Association Postdoctoral Fellow, Department of Cell Biology, The Scripps Research Institute, La Jolla, CA
2001-2004 University of California AIDS Research Postdoctoral Fellow, Department of Cell Biology, The Scripps Research Institute, La Jolla, CA
2004-2006 Staff Scientist (Non-PI), The National Center for Macromolecular Imaging, Baylor College of Medicine, Houston, TX
2006-2010 Keck Fellow (Principal Investigator), Department of Biochemistry and Biophysics, University of California, San Francisco, CA
2010-2015 Career-track Staff Scientist (Principal Investigator), The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA
2015- Career Staff Scientist (Principal Investigator), The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA

Other Experience and Professional Memberships

1998- Member, American Heart Association
1998- Member, American Biophysical Society
2006- Member, American Chemical Society
2011- Editorial board member, Journal of Physical Chemistry & Biophysics
2015- Editorial board member, Scientific Reports
2016- Associate director, California Separation Science Society (CASSS)

Honors

1986-90 Outstanding student awards for academic excellence in physics, Lanzhou University, China.
1988 First place award, University-wide competition in mathematics, Lanzhou University, China
1989 First place award, University-wide competition in physics, Lanzhou University, China.
1992 Second place award, Gansu Province boxing competition, China.
1999-01 Fellowship award, American Heart Association.
2002-04 Fellowship award, Univ. of California (University-wide AIDS Research Program).
2004- Research results collected by the *International Tables of Crystallography*, Vol. C
2006 Travel award, Gordon Conference (Lipoprotein Metabolism)
2012 Irvine H. Page Research Award (finalist), American Heart Association

2012 NIH R01 Award, National Health Institute, NHLBI, #1R01HL115153
2013 NIH R01 Award, National Health Institute, NIGMS, #1R01GM104427

C. Contribution to Science

1. **Parameterization of Elastic and Absorptive Electron Atomic Scattering Factors:** We computed the electron scattering factors and parameterized the factors of > 90 elements. The fitted parameters have been collected in the *International Tables of Crystallography, Volume C* since 2004. *International Tables* for *Crystallography* is the definitive resource and reference work for *crystallography* and structural science.
   a) Electron Diffraction. Colliex, C., J. M. Cowley, S. L. Dudarev, M. Fink, J. Gjonnes, R. Hilderbrandt, A. Howie, D. F. Lynch, L. M. Peng, **G. Ren**, A. W. Ross, V. H. Smith Jr, J. C. H. Spence, J. W. Steeds, J. Wang, M. J. Whelan and B. B. Zvyagin, *International Tables For Crystallography*. Volume C: Mathematical, physical and chemical tables, Edited by E.Prince, Fourth Edition, Published by Kluwer Academic Publishers (2006) Chapter 4.3, pp259-429.
   b) Robust Parameterization of Elastic and Absorptive Electron Atomic Scattering Factors, Peng L. -M, **G. Ren**, S.L. Dudarev and M.J. Whelan, *Acta Cryst. A* (1996), A52: 257-276.
   c) Debye-Waller Factors and Absorptive Scattering Factors of Elemental Crystals, Peng L.-M., G. Ren, S.L. Dudarev and M.J. Whelan, *Acta Cryst. A.* (1996), A52: 456-470.
   d) Accurate Measurements of Crystal Structure Factors Using a FEG Electron Microscope Using Digital Micrographs, **Ren G.** , J. M. Zuo and L.-M. Peng, *Micron*, (1997) 28: 459-467.
2. **First-time determined the near-atomic structure of membrane protein, AQP1 in vitrified ice by electron crystallography (others' determinations embedded in glucose):** Determined the first near-atomic structure of transmembrane protein that embedded in vitreous ice, i.e. 3.7Å resolution of aquaporin 1 (AQP1) water-channel by cryo-electron crystallography. This is the first membrane protein has been determined by electron microscopy in USA and the third membrane protein determined by electron microscopy in the world. The research work was cited by the advanced information of 2003 Nobel Prize in Chemistry. The paper has been cited for about 200 times.
   a) Visualization of a water-selective pore by electron crystallography in vitreous ice. **Ren, G.**, Reddy, V. S., Cheng, A., Melnyk, P., and Mitra, A. K. *Proc. Natl. Acad. Sci. USA*. (2001), 98: 1398-1403. PMID: 11171962
   b) Three-dimensional fold of the human AQP1 water channel determined at 4-Å resolution by electron crystallography of 2-dimensional crystals embedded in ice. **Ren, G.**, Cheng, A., Reddy, V., Melnyk, P., and Mitra, A. K. *J. Mol. Biolo.* (2000), 301: 369-387
   c) Polymorphism in the packing of Aquaporin-1 tetramers in 2-D crystals. **Ren, G.**, Cheng, A., Melnyk, P., and Mitra, A. K.. *J. Struct. Biol.* (2000). 130: 45-53
   d) The architecture of a water-selective pore in the lipid bilayer visualized by electron crystallography in vitreous ice. Mitra AK, **Ren G**, Reddy VS, Cheng A, Froger A., *Novartis Found Symp*. (2002) 245:33-46.
3. **Discovered the tunnel mechanism of cholesterol ester transfer protein:** Human cholesteryl ester transfer protein (CETP) mediates the net transfer of cholesteryl ester mass from atheroprotective high-density lipoproteins to atherogenic low-density lipoproteins. Four CETP inhibitors for treating cardiovascular diseases have been submitted to large scale clinical trials. However, the first two inhibitors failure in Phase III resulted more than 20 billion market volume evaporated, partially due to unknow mechanism of CETP. We used our developed optimized negative-staining (OpNS) discovered a tunnel mechanism, in which, CETP bridges a ternary complex with its N-terminal b-barrel domain penetrating into high-density lipoproteins and its C-terminal domain interacting with low-density lipoprotein or very-low-density lipoprotein. The related news was reported on the front page of DOE, the office of science on April 9, 2012. *http://science.energy.gov/news/featured-articles/2012/04-09-12/*
   a) Structure basis of transfer between lipoproteins by cholesteryl ester transfer protein. Zhang, L., F. Yan, S. Zhang, D. Lei, M. A. Charles, G. Cavigiolio, M. Oda, R. M. Krauss, K. H. Weisgraber, K.A. Rye, H.J. Pownall, X. Qiu & **G. Ren**. *Nature Chemical Biology*, (2012), 8(4):342-349. PMID: 22344176
   b) Structural Features of Cholesteryl Ester Transfer Protein: A Molecular Dynamics Simulation Study. Dongsheng Lei, Xing Zhang, Shengbo Jiang, Zhaodi Cai, Matthew J. Rames, Lei Zhang, Gang Ren*, and Shengli Zhang*. *Proteins*, (2013), 81:415–425.
   c) HDL surface lipids mediate CETP binding as revealed by electron microscopy and molecular dynamics simulation,M. Zhang, R. Charles, H. Tong, L. Zhang, M. Patel, F. Wang, M.J. Rames, A. Ren, K.A. Rye, X. Qiu, D.G. Johns, M.A. Charles, **G. Ren**. *Scientific Reports*, (2015), 5:8741; PMID: 25737239

d) Patent: Cholesterol ester transfer protein (CETP) inhibitor polypeptide antibodies for prophylactic and therapeutic anti-atherosclerosis treatments, **Ren, G.**, L. Zhang, WO 2013075040 A1, US 20140328851

4. **Developed a method for first-time 3D reconstruction of an individual/single macromolecule (without averaging) at near one nanometer resolution** Structural study on flexible, dynamic and heterogeneous macromolecules is challenging by current structural determination techniques, including X-ray crystallography, nuclear magnetic resonance (NMR) spectrum, small angle scattering and electron microscopy (EM) single-particle reconstruction due to the "signal" used to determine the structure by these techniques is the signal averaged from thousands to millions of different macromolecules. We reported an approach to determine the 3D structure of a single-instance macromolecule at near a nanometer resolution, termed individual-particle electron tomography (IPET). IPET does not require a pre-given initial model, class averaging of multiple molecules or an extended ordered lattice, but can tolerate small tilt-errors and sample heterogeneity. Through the structure determination of each individual macromolecule, the structural comparison of these macromolecules provides a new opportunity to reveal the soft-/bio-macromolecular dynamic character, equilibrium fluctuation, mechanism and even the intermediate-state 3D structure of chemical reaction.
   a) IPET and FETR: experimental approach for studying molecular structure dynamics by cryo-electron tomography of a single-molecule structure. Zhang, L. and **G. Ren**. *PLoS ONE*, (2012), 7(1):30249. PMID: 22291925).
   b) Calsyntenin-3 molecular architecture and interaction with neurexin 1α, Lu Z., Wang Y., Chen F., Tong H., Reddy M.V., Luo L., Seshadrinathan S., Zhang L., Holthauzen L.M., Craig A.M., **Ren G**.*, Rudenko G.*. *Journal of Biological Chemistry*. (2014), 289(50):34530-42. PMID: 25352602
   c) High-Resolution Single-Molecule Structure Revealed by Electron Microscopy and Individual- Particle Electron Tomography. Lei Zhang and **G, Ren**. *J Phys Chem Biophys* (2012), 2(2):1000e103:1-4
   d) *Three-Dimensional Structural Dynamics and Fluctuations of DNA-Nanogold Conjugates by Individual-Particle Electron Tomography*, Lei Zhang, Dongsheng Lei, J. M. Smith, H. Tong, X. Zhang, Z. Lu, P. Alivisatos and **G. Ren**. *Nature Communications* (2016)7:11083. doi: 10.1038/ncomms11083.
   e) Fully Mechanically Controlled Automated Electron Microscopic Tomography, Jinxin Liu, Hongchang Li, Lei Zhang, Matthew Rames, Meng Zhang, Yadong Yu, Bo Peng, César Díaz Celis, April Xu, Qin Zou, Xu Yang, Xuefeng Chen, **G. Ren**, *Scientific Reports*, (2016) 6:29231 | DOI: 10.1038/srep29231

5. **Revealing the structural dynamical and fluctuation of flexible antibody:** Commonly used methods for determining protein structure, including X-ray crystallography and single-particle reconstruction, often provide a single and unique three-dimensional (3D) structure. However, in these methods, the protein dynamics and flexibility/fluctuation remain mostly unknown. In this paper, we utilized advances in electron tomography (ET) to study the antibody flexibility and fluctuation through structural determination of individual antibody particles rather than averaging multiple antibody particles together. Through determined 120 ab-initio 3D density maps at an intermediate resolution (~1 – 3 nm) from 120 individual IgG1 antibody particles by IPET, we used these maps as a constraint and derived 120 conformations of the antibody via structural flexible docking of the crystal structure to these maps by targeted molecular dynamics simulations. Statistical analysis of the various conformations disclosed the antibody 3D conformational flexibility through the distribution of its domain distances and orientations. This is the first time to reveal the 3D structural fluctuation from a single molecule point of view.
   a) 3D structural fluctuation of IgG1 antibody revealed by individual particle electron tomography. X. Zhang, L. Zhang, H. Tong, B. Peng, M.J. Rames, S. Zhang, **G. Ren**. *Scientific Reports,* (2015), 5:8741
   b) Peptide-Conjugation Induced Conformational Changes in Human IgG1 Observed by Optimized Negative-Staining and Individual-Particle Electron Tomography, Huimin Tong, Lei Zhang, Allan Kaspar, Matthew J Rames, Liqing Huang, Gary Woodnutt, and **G. Ren**, *Scientific Reports*, (2013), 3(1089):1-9), DOI: 10.1038/srep01089

SELECTED LECTURES AND SEMINARS:

1. Mar. 2017, Workshop talk, *Individual-Particle Electron Tomography (IPET): an approach to study flexible soft-/bio-molecular structure and dynamics*. National Institute of Standard Technology (NIST), Gaithersburg, Maryland, U.S
2. Nov. 2016, Seminar, *3D image of a single protein*. National Institute of Standard Technology (NIST), Gaithersburg, Maryland, U.S
3. Sept. 2016, Seminar, 3D image of a single macromolecule. NIBS, Beijing, China

4. Jun. 2016, Seminar, *3D image of a single macromolecule*. NIBS, Beijing, China
5. Jun. 2016, Invited Talk, *The physics in Biology*. Lanzhou University, Lanzhou China
6. Jun. 2016, Seminar, *Image process techniques in biological research*. Beijing Normal University, Beijing, China
7. Jun. 2016, Seminar, *3D image of a single macromolecule Chinese Academy of Sciences*, Institute of Modern Physics, Lanzhou, China
8. May 2016, Seminar, *IPET: an approach to study protein mechanism, dynamics and aggregation*. Mercer University, Macon, GA 31207
9. Apr. 2016, invited talk, *Individual-particle electron tomography (IPET): an approach to study protein mechanism, dynamics and aggregation*. 21st Annual Sealy Center for Structural Biology Symposium, Galveston, TX
10. Apr. 2016, invited talk, *3D structural dynamics of DNA-nanogold conjugates,* NanoWorld Conference, Boston, MA
11. Apr. 2016, Invited talk, *Individual-particle electron tomography (IPET): an approach to study protein mechanism, dynamics and aggregation*. The Higher Order Structure 2014, An International Separation Science Society, Long Beach, CA
12. Mar. 2016, Seminar, *Individual-particle electron tomography (IPET): an approach to study the flexible protein structure, dynamics, mechanism and aggregation*. Medical College of Wisconsin, Milwaukee, WC
13. Oct. 2015, seminar, *Individual-particle electron tomography (IPET): an approach to study protein mechanism, dynamics and aggregation*. Eli Lilly, Indianapolis, IN
14. Aug. 2015, seminar, *Individual-particle electron tomography (IPET): an approach to study antibody structure, dynamics and aggregation*. Eli Lilly, San Diego, CA
15. Jul. 2015, seminar, *Individual-particle electron tomography (IPET): an approach to study the flexible protein structure, dynamics, mechanism and aggregation*. Biogen Inc., Boston, MA
16. April. 2015, seminar*, Individual-particle electron tomography (IPET): an approach to study the protein mechanism and dynamics*. University of Science and Technology China, Hefei, China.
17. April. 2015, invited talk, *IgG1 antibody structural dynamics and fluctuation*. 7th Annual International Congress of Antibodies-2015, Nanjing, China
18. Feb. 2014, invited talk, *IgG1 antibody structural dynamics and fluctuation*. The Higher Order Structure 2014, An International Separation Science Society, Arlington, Virginia
19. Sept. 2013, seminar, *Individual-particle electron tomography (IPET)*. Department of Chemistry, Univ of Cali, Berkeley, CA
20. Jun. 2013, seminar, *Individual-particle electron tomography (IPET): an approach to study antibody structure, dynamics and aggregation*. Genentech, South San Francisco, CA
21. Jun. 2013, invited talk, *dsDNA structural dynamics and fluctuation.* 18th Conversation of Protein Dynamics at Albany, NY
22. April, 2013, invited talk, *catching the intermediate state 3D structure during chemical reaction by individual-particle electron tomography.* Frontiers in Structural Biology of Membrane Proteins, Birmingham, AB
23. Nov. 15, 2012, seminar, *Individual-particle electron tomography (IPET).* UAB Department of Pharmacology & Toxicology, Birmingham, AB
24. Aug. 24, 2012, seminar, *Antibody dynamics by individual-particle electron tomography (IPET).* Abbott Inc, Boston, MA
25. Apr., 2012, plenary presentation, *Tunnel mechanism of cholesteryl ester transfer protein*. Arteriosclerosis, Thrombosis, Vascular Biology Ann. Meeting, Chicago, IL,
26. Apr. 21, 2012, invited talk, *Discoidal HDL structure and dynamics*. HDL summit meeting, Chicago, IL,

SELECTE PUBLICATIONS:

1. A Facile Method for Isolation of Recombinant Human Apolipoprotein A-I from E. coli, Nikita Ikon, Jennifer Shearer, Jianfang Liu, Jesse J. Tran, ShiBo Feng, Ayako Kamei, Jennifer A. Beckstead, Robert S. Kiss, Paul M. Weers, Gang Ren, and Robert O. Ryan, *Protein Expression and Purification*, (2017), in-press
2. Investigation of the Three-Dimensional Structural Dynamics and Fluctuations of DNA-Nanogold Conjugates by Individual-Particle Electron Tomography, Lei Zhang, Dongsheng Lei, Jessica M. Smith, Huimin Tong, Xing Zhang, Zhuoyang Lu, Paul Alivisatos and **Gang Ren**, *Nature Communications*, (2016) 7:11083. PMID: 27025159

3. Polyhedral 3D Structure of Human Plasma Very-Low-Density Lipoproteins by Individual Particle Cryo-Electron Tomography , Yadong Yu, Yu-Lin Kuang, Dongsheng Lei, Xiaobo Zhai, Meng Zhang, Ronald M. Krauss, **Gang Ren**, *Journal of Lipid Research*, (2016) 57(10):1879-1888
4. Molecular Architecture of Contactin-associated Protein-like 2 (CNTNAP2) and its Interaction with Contactin 2 (CNTN2), Zhuoyang Lu, M.V.V.V. Sekhar Reddy, Jianfang Liu1 Ana Kalichava, Jiankang Liu, Lei Zhang, Fang Chen, Yun Wang, Luis Marcelo F. Holthauzen, Mark A. White, Suchithra Seshadrinathan, Xiaoying Zhong, **Gang Ren**, Gabby Rudenko, *Journal of Biological Chemistry* , (2016), 291(46):24133-24147. PMID: 27621318
5. A Fully Mechanical Controlled Automation Electron Microscopic Tomography, Jinxin Liu, Hongchang Li, Lei Zhang, Matthew Rames, Xuefeng Chen, Xu Yang, **Gang Ren**, *Scientific Reports,* (2016), 6:29231, doi:10.1038/srep29231
6. Insights into the Tunnel Mechanism of Cholesteryl Ester Transfer using All-atom Molecular Dynamics Simulations, Dongsheng Lei, Matthew Rames, Xing Zhang, Lei Zhang, Shengli Zhang and **Gang Ren**, *Journal of Biological Chemistry*, (2016) 291(27):14034-44, PMCID: PMC4933163.
7. Large Conformational Changes of Insertion 3 in Human Glycyl-tRNA Synthetase (hGlyRS) during Catalysis, Xiangyu Deng, Xiangjing Qin, Lei Chen, Qian Jia, Yonghui Zhang, Zhiyong Zhang，DongSheng Lei, **Gang Ren**, Zhihong Zhou, Zhong Wang, Qing Li, Wei Xie, *Journal of Biological Chemistry*, (2016) 291: 5740-5752
8. Structural Study of IgG1 Antibody by Individual-Particle Electron Tomography, Xing Zhang, Yuheng Liao, Huimin Tong, Lei Zhang, Shengli Zhang, **Gang Ren,** *Progress in Biochemistry and Biophysics*, (2016) 43(9): 839-849
9. Multiple-stage structure transformation of organic-inorganic hybrid perovskite CH3NH3PbI3, Qiong Chen, Henan Liu, Hui-Seon Kim, Yucheng Liu, Mengjin Yang, Naili Yue, **Gang Ren**, Kai Zhu, Shengzhong Liu, Nam-Gyu Park, Yong Zhang, Xiangyu Deng, Xiangjing Qin, Lei Chen, Qian Jia, Yonghui Zhang, Zhiyong Zhang, *Physics Review X* , (2016), 6, 031042
10. Surface density-induced pleating of a lipid monolayer drives nascent high density lipoprotein assembly, Jere P. Segrest, Martin K. Jones, Andrea Catte, Medha Manchekar, Geeta Datta , Lei Zhang, Robin Zhang, Ling Li, James C. Patterson, Mayakonda N. Palgunachari , Jack F. Oram, and **Gang Ren**, *Structure*, (2015), 23, 1214–1226
11. Electron Tomography: A Three-Dimensional Analytic Tool for Hard and Soft Materials Research (Review), Peter Ercius, Osama Alaidi, Matthew J. Rames, and **Gang Ren**, *Advanced Materials*, (2015), 27(38):5638-63. doi: 10.1002/adma.201501015
12. HDL surface lipids dominate CETP binding revealed by electron microscopy and molecular dynamic simulation, Meng Zhang, River Charles, Lei Zhang, Matthew J. Rames, Kerry-Anne Rye, Xiayang Qiu, Douglas G. Johns, M Arthur Charles, **Gang Ren**, *Scientific Reports*, (2015), 5:8741.
13. Xing Zhang, Lei Zhang, Huimin Tong, Matthew J. Rames, **Gang Ren**, 3D structural fluctuation of IgG1 antibody revealed by individual particle electron tomography, *Scientific Reports*, (2015), 5, 09803; doi: 10.1038/srep09803
14. Calsyntenin-3: molecular architecture and interaction with neurexin 1alpha, Zhuoyang Lu, Yun Wang, Fang Chen, Huimin Tong, M.V.V.V. Sekhar Reddy, Lin Luo, Suchithra Seshadrinathan, Lei Zhang, Luis Marcelo F. Holthauze, Ann Marie Craig, Gang Ren, Gabby Rudenko, *Journal of Biological Chemistry*, (2014), 289(50):34530-42
15. Cationic lipid nanodisks as an siRNA delivery vehicle, Ghosh, M., **G. Ren**, J. B. Simonsen and R. O. Ryan, *Biochemistry and Cell Biology*, (2014) 92: 200–205
16. Rames, M., Y. Yu, and **G. Ren**, Optimized Negative-Staining: a High-throughput Protocol for Examining Small and Asymmetric Protein Structure by Electron Microscopy. *The Journal of Visualized Experiments,* (2014), 90,e51087,1-15, doi:10.3791/51087
17. Structure and Function of Cholesteryl Ester Transfer Protein in Transferring Cholesteryl Ester (Review), Dongsheng Lei, Huimin Tong, Lei Zhang, Xing Zhang, Shengli Zhang, **Gang Ren,** *Progress in Chemistry*, (2014), 26(5): 879-888.
18. Peptide-Introduced Conformational Changes to Human Immunoglobulin by Optimized Negative-Staining Electron Microscopy and Individual-Particle Electron Tomography, Tong, H., L Zhang, A. Kaspar, L. Huang, G. Woodnutt, and **G. Ren**. *Scientific Reports*, (2013), 3(1089):1-9
19. Optimized negative-staining electron microscopy for lipoprotein studies, Zhang, L., H. Tong, M. Garewal and **G. Ren**, *BBA General Subjects*, (2013) 1830(1):2150–2159, PMID:23032862

20. Structural Features of Cholesteryl Ester Transfer Protein: A Molecular Dynamics Simulation Study, Lei D., X. Zhang, S. Jiang, Z. Cai, M.J. Rames, L. Zhang, **G. Ren**, and S. Zhang. *Protein*, (2013), 81:415–425, PMID: 23042613
21. Optimized negative-staining protocol for lipid-protein interactions investigated by electron microscopy. M. Garewal, L. Zhang and G. Ren. in: *Lipid-Protein Interactions: Methods and Protocols Methods in Molecular Biology*, Edited by Jörg Kleinschmidt, Humana Press, (2013), Feb. 28th, ISBN 978-1-62703-274-2
22. IPET: an Experimental Method to Determine the 3-Dimensional Structure of an Individual Macromolecule, Zhang, T., Y. Peng，H. Tong, M. J. Rames, L. Zhang，G. Ren. *Progress in Chemistry*, (2013), 25(5): 669-676.
23. Structure basis of transfer between lipoproteins by cholesteryl ester transfer protein. Zhang, L., F. Yan, S. Zhang, D. Lei, M. A. Charles, G. Cavigiolio, M. Oda, R. M. Krauss, K. H. Weisgraber, K.A. Rye, H.J. Pownall, X. Qiu & **G. Ren**. *Nature Chemical Biology*, (2012), 8(4):342-349. PMID: 22344176
24. IPET and FETR: Experimental Approach for Studying Molecular Structure Dynamics by Cryo-Electron Tomography of a Single-Molecule Structure. Zhang, L. and **G. Ren**, *PLoS ONE*, (2012), 7(1):30249. PMID: 22291925
25. Optimized Negative-staining Protocol for Electron Microscopy Study of Lipoprotein Structure, Tong, H., L. Zhang，L.Q. Huang, G. Ren, *Progress in Biochemistry and Biophysic*, (2012), 2012, 39(10): 972~978
26. High-Resolution Single-Molecule Structure Revealed by Electron Microscopy and Individual Particle Electron Tomography, Zhang, L. and G. Ren, *Journal of Biophysics and Biochemistry*, (2012), 2(2):1000e103
27. The Morphology and Structure of Lipoprotein Revealed by Optimized Negative Stain. Zhang, L., J. Song, G. Cavigiolio, B. Ishida, S. Zhang, J. Kane, K.A. Rye, J. Wang, K.H. Weisgraber, H.J. Pownall, M. Oda, **G. Ren**. *J. Lipids Research*, (2011), 52(1):175-84. PMID: 20978167
28. Membrane-directed molecular assembly of the neuronal SNARE complex. Cho, W.J., J.S. Lee, L. Zhang, **G. Ren**, L. Shin, C.W. Manke, and B.P. Jena, *Journal of Cellular and Molecular Medicine*, (2011), 15(1):31-37. PMID: 20716122
29. Model of Human Low Density Lipoprotein and Bound Receptor Based on Cryo-EM. **Ren, G**., G. Rudenko, S.J. Ludtke, J. Deisenhofer, W. Chiu, H.J. Pownall, *Proc. Natl. Acad. Sci. USA*. (2010), 107(3):1059–1064. PMID: 20080547
30. An Optimized Negative-staining Protocol of Electron Microscopy for apoE4.POPC Lipoprotein. Zhang, L., J. Song, Y. Newhouse, S. Zhang, K.H. Weisgraber, and **G. Ren**, *J. Lipids Research*, (2010), 51(5):1228-36. PMID: 19965615
31. Assessment of the Validity of the Double Super Helix Model for Reconstituted High Density Lipoproteins - a combined computational- experimental approach, Jones, M.K., L. Zhang, A. Catte, L. Li, M. Oda, **G. Ren**, and J.P. Segrest, *Journal of Biological Chemistry*, (2010), 24;285(52):41161-71. PMID: 20974855
32. Individual Particle Electron Tomography: a Novel Tool for Examining the Structure of the Synthetic Targeted Drug Delivery Vehicles. J. Song, L. Zhang and G. Ren. Pharmaceutical Manufacturing and Packing Sourcer. (2010) winter, 26-30.
33. Apolipoprotein AI tertiary structures determine stability and phospholipid-binding activity of discoidal high-density lipoprotein particles of different sizes. Chen B., X. Ren , T. Neville, J. L. Mills, W. G., Jerome, D. W. Hoyt, F. D. Sonnichsen, **G. Ren**, and J. Wang, *Protein Science* (2009), 18: 921-935. PMID: 19384992
34. Structure of membrane-associated neuronal SNARE complex: Implication in neurotransmitter release. Cho, W-J., Shin, L.., **Ren, G**., Jena, B. P. *J. Cell Mol. Med.* (cover) (2009)13(10): 4161-4165. PMID: 19737333
35. Nanoscale three-dimensional contour map of protein assembly within the astrocyte porosome complex. W. J. Cho, **G. Ren** , J.-S. Lee, K. Jeftinija, S. Jeftinija, B. P. Jena. *Cell Biol Int.*, (2009) 33: 224-229. PMID: 19084606
36. The structure of apolipoprotein A-I in spherical high density lipoprotein of different size.Gangani, R. A., Silva, D., Huang, R., Morris, J., Fang, J., Gracheva, E.O., **Ren, G**., Kontush, A., Jerome, W.G., Rye, K., and Davidson, W.S. *Proc. Natl. Acad. Sci. USA*. (2008). 105, 12176-12181. PMID: 18719128
37. Nanodisks derived from amphotericin B lipid complex. Tufteland, M., **Ren, G**. and Ryan, R., *J. of Pharmaceutical Sciences*, (2008) 97(10):4425-32. PMID: 18271034
38. Amphotericin B induced interdigitation of apolipoprotein stabilized nanodisk bilayers. Nguyen T., Weers, P., Wang, Z., **Ren, G.**, Sulchek, T., Hoeprich, P. and Ryan, R., *Biochim. Biophys. Acta*. (2008) 1778(1):303-12. PMID: 17980702
39. The Interplay between Size, Morphology, Stability, and Functionality of High-Density Lipoprotein Subclasses. Cavigiolio, G., Shao, B., Geier, E.G., **Ren, G.**, Heinecke, J.W. and M.N. Oda., *Biochemistry*, (2008) 22; 47(16):4770-9. PMID: 18366184

40. EM 3D contour maps provide protein assembly at the nanoscale within the neuronal porosome complex. W.J. Cho, **G. Ren** and B.P. Jena. *J. Microscopy*, (2008) 232(1): 106-111. PMID: 19017207
41. Single particle image reconstruction of a tetramer of HIV integrase bound to DNA. Ren, G., Gao, K., Bushman, F., and Yeager, M., Journal of Molecular Biology (2007) 366: 286-294. PMID: 17157316
42. Neuronal fusion pore assembly requires membrane cholesterol. Cho J., A. Jeremic, H. Jin, G. Ren and Bhanu P. Jena. Cell Biol Int., (2007) 31: 1301-1308. PMID: 17703958
43. Electron Diffraction. Colliex, C., J. M. Cowley, S. L. Dudarev, M. Fink, J. Gjonnes, R. Hilderbrandt, A. Howie, D. F. Lynch, L. M. Peng, Ren, G., A. W. Ross, V. H. Smith Jr, J. C. H. Spence, J. W. Steeds, J. Wang, M. J. Whelan and B. B. Zvyagin, International Tables For Crystallography. Volume C: Mathematical, physical and chemical tables, Edited by E. Prince, Fourth Edition, Published by Kluwer Academic Publishers (2006) Chapter 4.3, pp259-429.
44. Model of the toxic complex of anthrax: Responsive conformational changes in both the lethal factors and the protective antigen heptamer. Tama, F., G. Ren, C. Brooks, AK. Mitra, Protein Science (Cover). (2006) 15: 2190-2200. PMID: 16943448
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PATENT:

- Cholesterol Ester Transfer Protein (CETP) Inhibitor Polypeptide Antibodies for Prophylactic and Therapeutic Anti-Atherosclerosis Treatments, Authors: **Gang Ren**, Lei Zhang; U.S. patent application no. 14/279,182, Intl. Patent Application Ser. No: PCT/US2012/065697 , Filed Date: 16-Nov-2012; Claiming priority to 61/560,751, LBNL Docket: IB-3143PCT,

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